

AMENDMENTS TO THE CLAIMS:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A driving circuit for a vacuum fluorescent display having a filament, a grid electrode and a segment electrode, the driving circuit comprising:
 - a filament driving unit for driving the filament;
 - a grid driving unit for pulse-driving the grid electrode;
 - a segment driving unit for pulse-driving the segment electrode; and
 - a controlling unit for enabling or disabling the filament to be heated with an output of the filament driving unit, the controlling unit disabling the filament to be heated with the output of the filament driving unit during an ON period when the ON period is shorter than a predetermined time period, the ON period being a time period during which a voltage able to drive the grid electrode and the segment electrode is applied to both of the grid electrode and the segment electrode validating or invalidating the output of the filament driving unit at a proper timing.
2. (Cancelled)
3. (Currently Amended) The driving circuit for a vacuum fluorescent display according to claim 1 ~~claim-2~~, wherein the controlling unit outputs a pulse driving signal for pulse-driving the filament.
4. (Currently Amended) The driving circuit for a vacuum fluorescent display according to claim 1 ~~claim-2~~, wherein during the ON period ~~time period~~-TW shorter than the predetermined time period, the controlling unit fixes the output of the filament driving unit at a predetermined level.

5. (Currently Amended) The driving circuit for a vacuum fluorescent display according to claim 1 ~~claim-2~~, wherein

~~the driving circuit for a vacuum fluorescent display enables the output of the filament driving unit to be set invalid when it is at some logic value, the driving circuit receiving from exterior data X that enables the output of the filament driving unit to be set valid when it is at another logic value~~ the driving circuit for a vacuum fluorescent display receives a setting data from an exterior, and

wherein the controlling unit:

~~sets the~~ disables the filament to be heated with the output of the filament driving unit ~~invalid for during the ON period time period-TW~~ that is shorter than the predetermined time period when the setting data ~~data-X~~ received from the exterior is at the some logic value; and

~~sets the~~ enables the filament to be heated with the output of the filament driving unit ~~valid~~ when the setting data ~~data-X~~ received from the exterior is at the other logic value.

6. (Currently Amended) The driving circuit for a vacuum fluorescent display according to claim 5,

wherein the driving circuit for a vacuum fluorescent display receives from an exterior a dimmer adjustment data ~~data-Y~~ correlated with the duty ratio of the output of the grid driving unit or the output of the segment driving unit, and

wherein the ON period time period-TW is a time period of the pulse width based on the duty ratio corresponding to the received dimmer adjustment data ~~data-Y~~.

7. (Currently Amended) The driving circuit for a vacuum fluorescent display according to claim 1 ~~claim-2~~,

wherein the driving circuit for a vacuum fluorescent display receives from exterior a dimmer adjustment data ~~data-Y~~ correlated with the duty ratio of the output of the grid driving unit or the output of the segment driving unit, and

wherein the controlling unit ~~invalidates~~ disables the filament to be heated with the output of the filament driving unit during the ON period ~~for the time period-TW~~ when the ON period

~~time period~~ TW based on the duty ratio corresponding to the received dimmer adjustment data
~~data Y is equal to or shorter than a~~ than the predetermined time period.

8. (Currently Amended) The driving circuit for a vacuum fluorescent display according to claim 1 ~~claim 2~~, wherein the driving circuit for a vacuum fluorescent display is a semiconductor integrated circuit, the driving circuit enabling a switching element that generates a voltage for pulse-driving the filament to be connected to exterior based on the output of the filament driving unit.

9. (Currently Amended) The driving circuit for a vacuum fluorescent display according to claim 1 ~~claim 2~~, comprising a switching element that generates a voltage for pulse-driving the filament based on the output of the filament driving unit.

10. (Original) The driving circuit for a vacuum fluorescent display according to claim 9, wherein the driving circuit for a vacuum fluorescent display is a semiconductor integrated circuit, the driving circuit enabling the switching element to be connected to exterior.

11. (Original) The driving circuit for a vacuum fluorescent display according to claim 9, wherein the driving circuit for a vacuum fluorescent display is a semiconductor integrated circuit integrated with the switching elements.

12. (Currently Amended) ~~The driving circuit for a vacuum fluorescent display according to claim 1, wherein when validating the output of the filament driving unit,~~

A driving circuit for a vacuum fluorescent display having a filament, a grid electrode and a segment electrode, the driving circuit comprising:

a filament driving unit for driving the filament;

a grid driving unit for pulse-driving the grid electrode;

a segment driving unit for pulse-driving the segment electrode; and

a controlling unit for enabling or disabling the filament to be heated with an output of the filament driving unit, the controlling unit enables enabling a pulse width and/or a pulse cycle of a

pulse driving signal for pulse-driving the filament to be set based on data received from exterior when enabling the filament to be heated with the output of the filament driving unit.

13. (Original) The driving circuit for a vacuum fluorescent display according to claim 12, wherein the data received from exterior includes pulse width data for setting the pulse width of the pulse driving signal, and

wherein the controlling unit generates the pulse driving signal having a pulse width corresponding to the received pulse width data.

14. (Original) The driving circuit for a vacuum fluorescent display according to claim 12, wherein the data received from exterior includes pulse cycle data for setting the pulse cycle of the pulse driving signal, and

wherein the controlling unit generates the pulse driving signal having a pulse cycle corresponding to the received pulse cycle data.

15. (Original) The driving circuit for a vacuum fluorescent display according to claim 12, wherein the data received from exterior includes pulse width data for setting the pulse width of the pulse driving signal and pulse cycle data for setting the pulse cycle of the pulse driving signal, and

wherein the controlling unit sets the pulse width and/or the pulse cycle of the pulse driving signal by putting the pulse driving signal at one level for a time period of the pulse width corresponding to the received pulse width data, and by putting the pulse driving signal at another level for a time period other than the pulse width among the pulse cycles corresponding to the received pulse cycle data.

16. (Original) The driving circuit for a vacuum fluorescent display according to claim 15, wherein the filament pulse controlling unit comprises:

a first comparing unit for comparing the pulse width data with a count value based on a reference clock signal;

a second comparing unit for comparing the pulse cycle data with a count value based on a reference clock signal;

a counting unit for generating the count value by dividing as predetermined the reference clock signal as well as resetting the count value when the result of the comparison at the first comparing unit or the second comparing unit shows coincidence; and

a controlling unit for putting the pulse driving signal at one level when the result of the comparison at the first comparing unit shows coincidence, and for putting the pulse driving signal at the other level when the result of the comparison at the second comparing unit shows coincidence.

17. (Original) The driving circuit for a vacuum fluorescent display according to claim 12, wherein the driving circuit for a vacuum fluorescent display is a semiconductor integrated circuit, the driving unit enabling the switching element that generates a voltage for pulse-driving the filament based on the pulse driving signal to be connected to the exterior.

18. (Original) The driving circuit for a vacuum fluorescent display according to claim 12, wherein the driving circuit for a vacuum fluorescent display comprises a switching element that generates a voltage for pulse-driving the filament based on the pulse driving signal.

19. (Original) The driving circuit for a vacuum fluorescent display according to claim 18, wherein the driving circuit for a vacuum fluorescent display is a semiconductor integrated circuit, the driving circuit enabling the switching element to be connected to exterior.

20. (Original) The driving circuit for a vacuum fluorescent display according to claim 18, wherein the driving circuit for a vacuum fluorescent display is a semiconductor integrated circuit integrated with the switching element.